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THE IDEALS OF SIGMA XI

BY HENRY SHALER WILLIAMS

After reading the admirable history of the first quarter century of Sigma Xi my mind runs back to the examination of those germ-thoughts out of which such a vigorous and enthusiastic brotherhood has grown. Ideals I call them because as I try to fix my attention upon that which inspired us at the outset and now attracts 7000 of us to the meaningless symbol Sigma Xi. I find it is not the benefits we derive from the organization but the ideals we take into it that are of value. I remember when one of our chapters was struggling for existence in a great eastern university it was refused the use of the college rooms for its meetings on the ground that it was only another college fraternity.

To be sure the "*Friendship in Science*" were the opening words of the first Constitution, and a little further on we meet the phrase "*Brotherhood in Science and Engineering*," but as I went over those crude documents the following sentence it seems to me contains the germ-thought which in the passing years has made the Sigma Xi great; viz. "*To lend aid and encouragement to those newer brothers who likewise laboring in the same sphere are aspiring to honored positions.*" In those early days the pupil caught sight of some peculiar ability in his admired teacher, not found in books nor recognized in scholarship, which inspired him more keenly and attracted him more powerfully than all the degrees or other prizes of the university. He did not recognize it in the literary scholar; it was not learning nor was it poetic light; it seemed more evident in the laboratory than in the lecture room.

So again the teacher as he studied his pupils found here and there one among them who might be unlearned and untrained, getting poor marks compared with his more cultured fellows, but who surpassed them all in the quickness and clearness of his grasp of new ideas; to whom vision seemed natural; who called for no explanations; who knew how to know. These were congenial spirits, the teacher and the pupil were both alive to the same stimuli, and

tho scarcely reckoned in estimating the values of either teacher or pupil these qualities were prophetic of great attainments.

Teacher and pupil alike aspired for due recognition of these qualities of such paramount importance to their work. It was the attraction of this new ideal which drew together kindred spirits, welded them into an organic unity, and in every university in which a chapter has been established has gathered into Sigma Xi the most vigorous and the ablest scientific students in the institutions. Its constitution, its key, its name, its meetings, all the external clothing of the Sigma Xi, have served to preserve its identity in the eyes of the public, but I believe it is the ideals which they enclose, the penetrative, conquering, creative spirit of research which has preserved its vitality, and will continue to be the one reason for the existence of Sigma Xi.

Its source may be traced back not only to the "confluence of those two streams", as Professor Ward has called it; viz., the student eager to attain success with the teacher seeking to bring out the best in the pupil; but there are many influences contributing to the birth of the movement. A review of some of the chief terms by which the founders defined their purpose will show what they were.

Research and investigation are almost synonymous terms, but the *re* of research is the significant element. In selecting the term research to express our ideal we were protesting against the supposition that a truth or a bit of knowledge is exhausted by having been once investigated and defined. Definitions and laws and the formulae of science are human contrivances, made under particular conditions, based, may be, on fundamental propositions, but research does not stop with them. She looks past them, beneath them for the meanings that they hold. Like dogmas they must ever be recast to fit them to the issues of the present. Not only does the world move but we the observers of the world move, and our landscape changes with each new position occupied. This fundamental principle of research we discover applies not only to scientific investigation but to progress of all kinds. The spirit of research is not confined to the specialist in the laboratory but is becoming the dominating characteristic of the American people.

Scholarship is another term prominent in the early formulation of our ideals. As I look back after the twenty-five years of our history and ask what it was that led to the choice of this word I am inclined to think our minds were thinking of the great scholar rather than his scholarship. As a student in Yale College I knew and revered many distinguished leaders in scholarship, and (was it not

erroneously?) I imagined that it was their scholarship that made them great, strong, and successful beyond their fellows.

Now that the Sigma Xi has become of age, and many changes have come to knowledge, I discover that it certainly was not learning, a close synonym of scholarship, which was in mind. Learning is the quality which has made the Chinese to be one of the greatest people in the world. They have preserved their integrity as a race from the dim ages of the past. They have resisted the incursion and admixture of foreign influences while in other parts of the earth nations have been born, become great, and sunk back into oblivion. They have from the time of Confucius handed down the principles of human wisdom in a pure and simple form to the present day. They have clearly discovered truth, virtue, human justice and good government, but the quality they exhibit in supreme perfection is the power of standing still without losing strength or virility.

The Chinese are the antipodes of the modern American. By making this extreme comparison we discover the opposite directions in which we are led by the ideals of scholarship and those of research. And we see that what has been inspiring Sigma Xi to her best endeavors is not scholarly ambition but something else. It is not what we can learn from others or from books that we admire, it is not imitation of any kind, but it is the power of initiation.

Altho the chief function of our universities is educating their pupils in these scholarly lines, it is not their only task. It was Sigma Xi that called attention to this other quality equally needing the fostering, training, development and education of the University. To train in research ability it is necessary to give attention to the individual, to find out his peculiarities and personal capacities. It is something other than trimming him into a likeness to his fellows or adjusting him to some preconceived standard of perfection. We need to ask what is each man fitted to do and train him to do it better.

The training required to make a successful experimenter is a training of perception and judgement rather than of memory. He needs to appreciate, as by intuition, the world as it is about him; to see things in their true perspective, and to value them in the light of their actual relations to other things. It is an easy matter to determine the value of repeated action by comparing it with results of past experience; but there are no precedents to guide the initiator of new enterprises. The pioneer of a new country must carry his own compass and know how to feel his way in the dark. But at the same time it is true that research is not all. A knowledge

of what is already known is nowhere more important than in research. Whoever dares to deviate from the trodden paths must know them well; who would lift a heavy load must plant his feet solidly on the ground. Another word is conspicuous in the definitions of the ideal of Sigma Xi, the word promise. A misunderstanding of it has arisen in attempting to apply it in selecting candidates for membership. Promise is to be sure, contrasted with fulfillment and it is quite pertinent to argue: If our membership is to be based upon some definite quality why not wait until we have accomplished results as evidence of it?

But promise means more than non-fulfillment, it means purpose, potency, prophecy,—and when we combine it with research we find our ideal is very near akin to what Bergson so fascinatingly describes under the term impulse. We are familiar with the term good scholar as applied to a student. The term does not mean that he has produced any literary work of merit by which he can be distinguished from his fellows, but that he exhibits the learning capacity. He shows the power to grasp and retain information and express it in standard literary terms. When we give our attention to the creative rather than the retentive powers of the mind, promise has the same relation to the future which memory has to the past. This reaching after something still to be attained is the quality of mind to which the term promise is applied by Sigma Xi.

As we pick out athletes to train them for the race before they have run, by their vision of the goal and their determination to reach it, so in Sigma Xi, we may detect promise of ability for research by the readiness with which the student leans toward the undiscovered side of any subject under discussion, the eagerness with which he welcomes every new idea presented to his mind, and by the way in which he piles fact upon fact to lift himself into higher and broader understanding and comprehension.

These are the promises of ability for research we wish to give credit for, encourage, and train in our universities. The importance of detecting these powers early comes from the necessity of a thoro training for the man who shall succeed in reaching the higher goal of research. A man's life is limited, and his best productive days are not far ahead of his graduation. It is very easy to fall back into routine work, especially so to the successful scholar when he meets keen competition in life. Far easier to apply what he has learned than to press still forward to more strenuous tasks.

Most of us who have attempted a life of investigation and research find, after a life full of endeavor, that the field has simply broadened as we have advanced, and that the goals aimed at are

still in the far distance, a little clearer in view may be but still unattained. So Sigma Xi as an educational factor will be of great service if it succeeds year by year in detecting among the undergraduates only a few who in some marked degree exhibit this promise of ability for research, selects them, and gives them, not only the encouragement of elder brothers but the training required to fit them to enter into the life work of research.

Another term used in the original definition is modern, the meaning grows as we contemplate it. At first we naturally contrast modern with ancient, but we must notice that it is not its modernity that gives value to the things of to-day over those of the past. Modern includes the living present, and it is the living reality of the present which is contrasted with the dead memory of the past that interests us.

So when we describe our ideals as modern, we mean that we have tied ourselves to the ever moving present which advances with irresistible energy and which no conceivable force can either delay or hasten. The importance of this ideal consists in the impulsion it gives to our lagging footsteps telling us that to be really modern we must be incessantly advancing. Not only learning but science seems to be made out of the unchanging elements of memory. We need therefore to keep the word modern in mind and take firm hold of those elements of knowledge which change their appearance as they and we pass thru the ever changing conditions of the present. And now that we are still living at the end of a quarter century we may well acknowledge the temerity with which we burst into the world, preferring anything rather to die unborn.

A few of us, all young men with laurels still to be earned, solemnly banded together in competition with Phi Beta Kappa which at that time was recognized as representing the highest ideals attainable in any university in the land. We set out to give our members a place of honor among scholars while repudiating the validity of the current marking system. We labeled our organization with the Greek letters which at the outset had no meaning either to those inside or out. And as I have already noted, we adopted scientific research as our ideal none of us knowing anything of research but the promise of it. This was certainly a bold step to take—I can justify it only by the assumption that the ideals we fought for were worthy to live, and may we not hope that Sigma Xi will continue to be useful by fostering and developing her germinal ideals.

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